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**Name of Organization:** USGS

**Type of Organization:** Federal Agency

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**Project Title:** Toxic Sediment Effects on Quality of Ground-Water Discharge

**Project Category:** Contaminated Sediments

**Rank by Organization (if applicable):** 1

**Total Funding Requested (\$):** 300,000 **Project Duration:** 2 Years

**Abstract:**

The project would investigate the effects of toxic streambed sediments in the Grand Calumet River on the quality of ground-water discharged to the river. A series of wells would be installed at two transects across the river. At each location on a transect, two wells would be installed, one screened in the streambed sediments, and the other in the sand (Calumet aquifer) beneath the sediments. Water levels would be measured on a monthly basis for one year in all wells and the river to obtain information about the relation between surface water and ground water at the transects. Selected wells would be equipped with water-level recorders to provide continuous data. Samples would be collected from the wells and the river twice, once during Spring and again, during Fall. Selection of the appropriate analysis would be made in consultation with the U.S. Environmental Protection Agency, the Indiana Department of Environmental Management, and other interested groups. A quality assurance plan would be followed for all sampling and analyses activities. Analysis of the samples would provide accurate data on the quality of ground water in the Calumet aquifer in the immediate vicinity of the river, the quality of water in the streambed sediments, and the quality of water in the Grand Calumet River. Therefore, the data will describe the changes in quality as the water flows through the sediments to the river. Ideally, one transect should be in a location where ground-water contamination is known, and the other in an area where contamination is less likely. This allows a comparison of the extreme conditions. Results of the project would be published in a U.S. Geological Survey report that describes the design and methods of study and presents the data and interpretations. The report would be available on the Internet.

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**Geographic Areas Affected by the Project**

**States:**

<input type="checkbox"/> Illinois	<input type="checkbox"/> New York
<input checked="" type="checkbox"/> Indiana	<input type="checkbox"/> Pennsylvania
<input type="checkbox"/> Michigan	<input type="checkbox"/> Wisconsin
<input type="checkbox"/> Minnesota	<input type="checkbox"/> Ohio

**Lakes:**

<input type="checkbox"/> Superior	<input type="checkbox"/> Erie
<input type="checkbox"/> Huron	<input type="checkbox"/> Ontario
<input checked="" type="checkbox"/> Michigan	<input type="checkbox"/> All Lakes

**Geographic Initiatives:**

<input type="checkbox"/> Greater Chicago	<input type="checkbox"/> NE Ohio	<input checked="" type="checkbox"/> NW Indiana	<input type="checkbox"/> SE Michigan	<input type="checkbox"/> Lake St. Clair
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**Primary Affected Area of Concern:** Grand Calumet River/IHC, IN

**Other Affected Areas of Concern:**

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***For Habitat Projects Only:***

**Primary Affected Biodiversity Investment Area:** Not Applicable

**Other Affected Biodiversity Investment Areas:**

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**Problem Statement:**

Northwestern Indiana, including the cities of Gary, Hammond, and East Chicago is an Area of Concern to the Indiana Department of Environmental Management and a Geographic Enforcement Initiative Area for the U.S. Environmental Protection Agency. More than 100 years of large-scale industrial activity have left a legacy of contaminated soils, surface water, and ground water. The area drains to Lake Michigan, through the Indiana Harbor Canal, by way of the Grand Calumet River, a slow-moving, entrenched stream that primarily functions as the outfall for industrial and municipal discharges. The Calumet aquifer, a surficial sand aquifer that underlies the area, is vulnerable to contamination because of the relatively permeable soils and shallow depth to the water table. The relation between ground water in the Calumet aquifer and the Grand Calumet River is not well defined. Surface and ground-water-level data indicate that shallow ground water should discharge to the river. A previous study of flow and water quality estimated that 90 percent of the flow in the river was from industrial and municipal discharges and 10 percent was from ground water. Fine-grained, organic sediments in the streambed of the river may impede the flow of water between the aquifer and the river and, because these sediments have been shown to contain large concentrations of some regulated compounds, probably change the quality of ground water that flows through the sediments to the river. Knowledge of the interaction between ground water and surface water and the effects of the streambed sediments on water quality is critical to on-going programs of federal and state environmental agencies including the Remedial Action Plan, Natural Resource Damage Assessment, Total Daily Maximum Loads, Lake Area Management Plan, and sediment-dredging projects.

**Proposed Work Outcome:**

The project would provide hydraulic and water-quality data that will be used to gain insight on the relation between ground water in the Calumet aquifer and surface water in the Grand Calumet River. The data, interpretations and results would be distributed in a published format and would be made available on the Internet. This information can be used by environmental planners and regulators to evaluate on-going projects such as the Total Daily Maximum Loads, the Natural Resource Damage Assessment, and sediment-dredging projects. Documentation of the project would include an assessment of the methods that were used and could help define the best applications of the methods to guide additional studies in more efficient data collection.

This project would result in the following products: transects of wells, hydrologic, geologic, and water-quality data, a quality-assurance plan for the water-quality data, a published report of the effects of toxic sediments on the quality of ground-water discharge in the Grand Calumet River/Indiana Harbor Canal, and project information available on the Internet.

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The following benefits will be derived from dissemination and use of the information and interpretations from this project: improved reliability of the Total Maximum Daily Loads, technical references for the Natural Resources Damage Assessment and Remedial Action Plan for the Grand Calumet River/Indiana Harbor Canal, evaluation criteria for proposed sediment-dredging projects in the Grand Calumet River and similar Great Lakes environments, and technical reference for the Lake Area Management Plan.

(Note: Laboratory analysis by the USGS National Water Quality Laboratory is in the project budget category "Contracts".)

**Project Milestones:****Dates:**

Project Start	08/2000
Wells and recorders installed	12/2000
Sample wells and surface water	05/2001
Sample wells and surface water	09/2001
Draft report completed	02/2002
Final report publication	08/2002
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Project End	/

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☐ Project Addresses Environmental Justice

**If So, Description of How:**

☒ Project Addresses Education/Outreach

**If So, Description of How:**

Published report will be distributed to public libraries, to Federal, State, and local officials, and will be available on the Internet. If requested, project personnel will be available to provide technical information at public meetings arranged by Federal, State, or local officials.

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**Project Budget:**

	<b>Federal Share Requested (\$)</b>	<b>Applicant's Share (\$)</b>
<b>Personnel:</b>	156,100	0
<b>Fringe:</b>	0	0
<b>Travel:</b>	8,300	0
<b>Equipment:</b>	16,600	0
<b>Supplies:</b>	9,860	0
<b>Contracts:</b>	79,800	0
<b>Construction:</b>	0	0
<b>Other:</b>	29,340	0
<b>Total Direct Costs:</b>	300,000	0
<b>Indirect Costs:</b>	0	0
<b>Total:</b>	300,000	0
<b>Projected Income:</b>	0	0

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**Funding by Other Organizations (Names, Amounts, Description of Commitments):**

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**Description of Collaboration/Community Based Support:**

The project will be coordinated with stakeholders in the project outcome, including Federal, State, and local-regional agencies. As arranged with these agencies, coordination also may include representatives from business, industry, academia, or environmental organizations.